probable that the presence of this high pressure was responsible for the unusual amount of fog reported by vessels on the northern steamer route, as well as for the dense cloudiness frequently experienced.

NORTH AMERICA.

By H. C. FRANKENFIELD, Supervising Forecaster.

As indicated in the general discussion above, pressure distribution during the month of May was not of decisive character. On the whole, pressure somewhat above normal prevailed, with resulting low temperatures over the greater portion of the country, only the Southwest, a small section of the near Northwest, and the southern districts west of the Rocky Mountains reporting a slight excess. There were no severe storms, but precipitation was in excess over the Gulf and Plains States and the upper Mississippi Valley, Elsewhere it was deficient.

NORTH ATLANTIC OCEAN.

By F. A. YOUNG.

The average pressure for the month was considerably above the normal at land stations on the American and northern European coasts, as well as the Azores, while it was below in the West Indies and Gulf of Mexico.

According to reports received the number of days on which gales occurred over the steamer lanes was not far from the normal, although nearly all of the severe weather was confined to two periods in the first and second decades, respectively, while during the remainder of the month comparatively moderate conditions prevailed.

Fog was apparently somewhat less prevalent than usual over the greater part of the ocean, except in the vicinity of the British Isles, where it was reported on from six to seven days, which is somewhat above the normal.

Charts IX to XII, covering the period from May 2 to 5, inclusive, show a disturbance over the steamer lanes that was especially severe on May 4 and 5.

The storm log from the British S. S. *Chipawa* is as follows:

Gale began on the 2d. Lowest barometer reading, 29.49 inches, at 4 a. m. on the 3d; position, 42° 35′ N., 41° 20′ W. End of gale on the 4th. Highest force, 10; shifts of wind near time of lowest barometer SW–W by S.

The observer on the British S. S. *Derwent River* states:

Gale began on the 4th. Lowest barometer, 29.50 inches, at 2 p. m. on the 4th; position, 47° 20′ N., 35° 15′ W. End of gale on the 6th. Highest force of wind, 9; shifts of wind WSW–NW.

From the 6th to the 12th the conditions over the ocean were nearly normal, and only a few scattered reports were received denoting winds of gale force. On the 13th the British S. S. *Cairndhu* was the only vessel reporting gales; her storm log is as follows:

Gale began on the 13th. Lowest barometer reading, 29.10 inches, at noon on the 13th; position, 51° 34′ N., 43° 17′ W. End of gale 4 p. m. on the 14th. Highest force of wind, 10. [No shifts of wind given.]

Charts XIII and XIV for May 17 and 18, inclusive, show the nearly stationary depression central off the British Isles, and the storm area of limited extent over the eastern part of the steamer lanes. The storm log from the British S. S. *Galtymore* is as follows:

Gale began on the 17th. Lowest barometer reading, 29.65 inches, at 10 a. m. on the 17th; position, 49° 48′ N., 25° 18′ W. End of gale on the 18th. Highest force of wind 10; shift of wind near time of lowest barometer W–NW–N. The observer on the American S. S. *Triumph* states:

Gale began on the 17th. Lowest barometer, 29.53 inches, at 3 a. m. on the 18th; position 49° 38′ N., 11° 00′ W. End of gale on the 19th. Highest force of wind 10; shifts of wind WSW–W by S–W.

From the 19th to the 30th the conditions were comparatively featureless, light to moderate winds prevailing over the entire ocean during that period. Fog was reported on the Banks of Newfoundland from the 19th to the 23d, and off the British coast from the 21st to the 29th. On the 31st two vessels between the 35th and 40th parallels and the 40th and 50th meridians experienced moderate gales, while moderate weather prevailed over the rest of the ocean, with fog in the middle and western sections of the steamer lanes.

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

Great Britain.—The exceptionally severe and widespread thunderstorms at the end of the month will long be remembered, but for the most part the weather, though wet, was cool, there being no thundery hot weather until the 20th.

* * * During the first 11 days the atmospheric conditions were decidedly chilly, and there was frost * * * at many inland stations. On the 1st, at Eskdalemuir, a shade minimum of 21° F. was recorded, with 13° F. on the ground. Sleet was also reported at some of the southern stations during these early days, but milder conditions gradually prevailed, and after the 11th the thermometer seldom fell below the freezing point. * * *

Soon after the 20th warm weather became general, and conditions for about a week, especially over southern and eastern England, were very fine, sunny, and warm. * * * On the 26th and 27th a long valley of relatively low pressure was stretched across England and the Netherlands, and within this belt violent thunderstorms occurred [especially on the 29th]. * * * At Shrewton, Wilts, 12 mm. [of rain] fell in 10 minutes, and at Nettlebed, Oxon, 44 mm. in 45 minutes. * * * In Lancashire and Lincolnshire * * * there were floods which caused loss of life and serious damage to property. * * * [At Hallington, 4.10 in. fell in two hours, when the gauge overflowed and the exact total fall was lost. The Lud stream, normally 3 ft. wide and 1 ft. deep, was swollen to a width of 52 yards and a depth of 50 ft.] The general rainfall expressed as a percentage of the average was: England and Wales, 117; Scotland, 164; Ireland, 145.

In London (Camden Square) the * * * mean temperature was 57.5° F., or 3.5° F. above the average. The duration of rainfall was 20.5 hours. * * *[1]

Southern Europe.—* * * Under the influence [of anticyclonic conditions] high day temperatures were recorded at many stations, 90° F. at Clermont and Biarritz on the 11th and at Perpignan on the 27th and 29th, and 94° F. at Clermont on the 28th. Both Madrid and Lisbon recorded 86° F. on the 8th, and on the 21st Rome reached 91° F., a temperature not exceeded in May since 1834.[1]

[1] *The Meteorological Magazine*, June, 1920, pp. 99 and 104.

Spain.—Madrid, May 14.—Terrific hailstorms, accompanied by thunder and lightning, have swept through central Spain, washing away railway tracks, inundating lowlands, and greatly damaging olive and fruit crops. The bull ring at Toledo is reported under water, and in the outskirts of Madrid trolley lines are blocked by huge quantities of sand that were washed down from the hills upon the tracks.—*New York Evening Post, May 15, 1920.*

Italy.— * * * Italy continued to suffer from disastrous drought.[1]

France.— * * * On the evening of the 25th a heavy storm, with hail and much wind, burst over Paris, unroofing houses, breaking windows, and destroying crops.[1]

Germany.—In Germany * * * there were severe thunder storms and considerable floods.[1]

[1] *The Meteorological Magazine*, June, 1920, pp. 99 and 104.

Canada.—In Ontario May was the driest month for 27 years, and the grain crops were backward, while the hay crops promised to be a partial failure. Forest fires developed in Ontario, Quebec, and New Brunswick, but fortunately the flames were checked by heavy rains at the beginning of June.[1]

Egypt.—Cairo recorded 99° F. on the 27th.[1]

New South Wales.—The wheat crop has been disastrously affected by the drought which has existed in all parts of New South Wales. It is estimated that the yield of the present season will be only 4,296,000 bushels, the smallest amount during the past 20 years. There is, in fact, an insufficient amount of wheat even for domestic consumption in Australia.—*Commerce Reports, Washington, D. C., May 26, 1920.*

[1] *The Meteorological Magazine*, June, 1920, pp. 99 and 104.

DETAILS OF THE WEATHER OF THE MONTH IN THE UNITED STATES.

CYCLONES AND ANTICYCLONES.

By R. HANSON WEIGHTMAN, Meteorologist.

Cyclones.—The number of LOWS was much greater than the average, the month being unusual on account of the great number of secondary developments. The table which follows gives the number of lows by types.

Lows.

	Alberta.	North Pacific.	South Pacific.	Northern Rocky Mountain.	Colorado.	Texas.	East Gulf.	South Atlantic.	Central.	Total.
May, 1920	5.0	0.0	0.0	2.0	7.0	1.0	2.0	2.0	0.0	19.0
Average number, 1892–1912	2.9	1.3	1.2	0.7	1.4	0.7	0.2	0.3	1.0	9.7

Anticyclones.—HIGHS were greater than the average in number, the Pacific highs being more frequent than usual, while the number of the Alberta type showed a deficit. The table hereunder shows the number of HIGHS by types.

Highs.

	North Pacific.	South Pacific.	Alberta.	Plateau and Rocky Mountain Region.	Hudson Bay.	Total.
May, 1920	3.0	2.0	2.0	1.0	1.0	9.0
Average number, 1892–1912	1.3	0.5	3.3	0.7	0.9	6.7

THE WEATHER ELEMENTS.

By P. C. DAY, Climatologist and Chief of Division.

[Weather Bureau, Washington, July 1, 1920.]

PRESSURE AND WINDS.

With the approach of summer, pressure variations in the United States and Canada become less pronounced, the high and low areas have weaker gradients than during the colder months of the year, and their drift eastward is usually slower and along more northerly paths. May, 1920, was no exception to the general rule, save that the storm areas developed generally in lower latitudes and the HIGHS persisted for longer periods in the districts from the Great Lakes eastward, than is usual for that month. As a result, the monthly distribution was somewhat different from the normal over the more eastern districts, with averages highest along the International Boundary from the Dakotas eastward and lowest along the south Atlantic and Gulf coasts, the reverse of the normal distribution. West of the Great Plains the average pressure distribution was maintained along the usual lines, save that the high-pressure area over the North Pacific coast was more fully developed and the permanent warm-season depression over the lower Colorado River Valley was deeper than usual.

In the general absence of well-developed storm areas, the winds were not unusually high at any point and few stations reported velocities above 50 miles per hour, and severe local storms were much less frequent than during the two preceding months. The highest wind of the month along the middle and south Atlantic coasts was experienced on the 1st and 2d, and the only severe tornado of the month occurred on the 2d in Oklahoma, a full description of which appears in another portion of this issue.

The persistence of high pressure over the Great Lakes and eastward caused cool northerly winds during much of the month over the districts to eastward of the Mississippi River, this being particularly the case over the southeastern States. Between the Mississippi River and the Rocky Mountains the winds were mostly from the south. Along the Pacific coast they were generally from west to northwest.

TEMPERATURE.

The month opened with moderate temperatures in most sections of the country, but by the morning of the 3rd abnormally cold weather overspread the northern districts, with heavy to killing frosts in the Lake region and over the upper Ohio Valley, and temperatures were below freezing in the higher elevations of the Rocky Mountains. About the middle of the first decade increasing pressure over the Great Lakes caused a further lowering of the temperature in eastern districts and heavy to killing frosts were reported from the adjacent regions. Considerably warmer weather prevailed during the latter part of the decade in the north-central border districts, but moderately cold weather for the season continued in the Eastern States until near the close, when much warmer weather prevailed over that area, and by that time temperatures had gradually risen to above the seasonal average in nearly all sections of the country except in the far West.